

**REMARKS**

Claims 1-23 and 25 are currently pending in this application. Claim 23 is amended and claim 25 is newly added. Support for new claim 25 can be found at least at page 8, line 30-37. No new matter is added.

Applicants wish to thank the Examiner for indicating the allowable subject matter of claims 12-14, 16-19 and 21-22.

**I. Claim Objections**

Claim 23 is objected to under 37 C.F.R. §1.75(c) as being a multiple dependent claim. By this Amendment, claim 23 is amended to delete its dependence on claim 1. Reconsideration and withdrawal are respectfully requested.

**II. Claim Rejections Under 35 U.S.C. §112**

Claim 24 is rejected under 35 U.S.C. §112, second paragraph, as being indefinite and 35 U.S.C. §101 as being a use claim. By this Amendment, claim 24 is canceled and the rejections are, therefore, moot. Reconsideration and withdrawal are respectfully requested.

**III. The Claims Define Patentable Subject Matter**

Claims 1-11, 15 and 20 are rejected under 35 U.S.C. §102(e) as being anticipated by Aitken et al., U.S. Patent No. 7,143,609 (hereinafter "Aitken"). Applicants respectfully traverse the rejection.

The claimed invention is directed to a composition of vitroceraamic type comprising, in mol%:

Ge	5-40
Ga	< 1
S+Se	40 - 85
Sb+As	5 - 40
MX	2 - 25
Ln	0-6
Adjuvant	0 - 30

in which:

- M represents at least one alkali metal chosen from Rb, Cs, Na, K and Zn,
- X represents at least one chlorine, bromine, or iodine atom,
- Ln represents at least one rare earth metal, and
- Adjuvant represents at least one additive composed of at least one metal and/or

at least one metal salt,

with the sum of the combination of the molar percentages of the components present in said composition being equal to 100.

Aitken discloses glass optical components made of non-oxide glasses such as (1) chalcogenide glasses, (2) chalco-halide glasses, and (3) halide glasses. These glasses have different compositions and are disclosed in the reference independently from one another.

#### Chalcogenide glasses

The chalcogenide glasses contain in their glass-forming matrix a chalcogene element, which may be one or more elements of the sulphur group (e.g., S, Se, or Te) in the periodic table, and may be combined with arsenic (As) antimony (Sb), germanium (Ge), gallium (Ga), etc. (col. 6, lines 54-60). Moreover, chalcogenides exhibit excellent optical transparency in the near and far infrared spectral region ( $> 700\text{nm}$ ). See Aitken at col. 7, lines 4-11.

Aitken discloses many compositions of chalcogenide glasses, three of which are represented below:

*Composition no 1:*

GE	0-35%
S	30-85%
As	0-55%

*Compositions no 2 (Example 1):*

Ge	8.75 %
S	73.75 %
As	17.5 %

Wavelength transmission  
range: 530 - 2400 nm

*Composition no 3 (Example 2):*

Ge	12.5 %
S	62.5%
As	25.0 %

Wavelength transmission  
range: 560 - 2400 nm

See Aitken at col. 8, lines 24-33; and Table 1, col. 8, line 50 - col. 9, line 18.

To modify the optical, thermal, and/or mechanical properties of the glasses, Ga, Se, Sb, Cl, Br, I, etc., may be added as optical constituents. Other elements, such as rare earths, or fluxes (e.g., Li, Na, K) may also be included. See Aitken at col. 8, lines 27-33.

Chalco-halide glasses

Alternatively, Aitken teaches chalco-halide glasses. The chalco-halide glasses are similar in composition to the chalcogenide glasses except that the chalco-halide glasses comprise further Cl, Br, and/or I. A typical system would be glasses encompassed by the member components As-S-I. Similar glasses exist in the systems: As-S, Se-Cl, Br; Ge-S, Se-Cl, Br, I; and Ge-As-S, Se-Cl, Br, I. See Aitken at col. 9, lines 48-58.

Halide glasses

Further, Aitken teaches that halide glasses can also be employed as optical and electro-optical components. Particular examples of halide glasses may be drawn from the wide family of fluorozirconate glasses of which a typical example has composition in terms of mole percent of about: 53 % ZrF<sub>4</sub>, 20 % BaF<sub>2</sub>, 4 % LaF<sub>3</sub>, 3 % AlF<sub>3</sub> and 20 % NaF. See Aitken at col. 10, lines 19-33.

None of the compositions disclosed anticipate the claimed invention. In order to anticipate the claimed invention, each and every element and limitation of the claimed invention must be formed in a single prior art reference. See *Brown v. 3M*, 265 F3d 1349, 1351, 60 USPQ2d 1375 (Fed. Cir. 2001), *cert denied*, 122 S. Ct. 1436 (2002).

As stated above, the compositions of each one of the chalcogenide glasses, the chalcogen halide glasses, and the halide glasses, disclosed by Aitken are different embodiments independent one from each other and should be considered as such to evaluate the patentability of the present invention.

The claimed invention is directed to a composition of vitroceramic type comprising, in mol%:

Ge	5-40
Ga	< 1
S+Se	40 - 85
Sb+As	5 - 40
MX	2 - 25
Ln	0-6
Adjuvant	0 - 30

in which:

- M represents at least one alkali metal chosen from Rb, Cs, Na, K and Zn,
- X represents at least one chlorine, bromine, or iodine atom,
- Ln represents at least one rare earth metal, and
- Adjuvant represents at least one additive composed of at least one metal and/or

at least one metal salt,

with the sum of the combination of the molar percentages of the components present in said composition being equal to 100.

The Office Action asserts that zero is one possible amount of the components Ga, Ln and Adjuvant. Thus, claim 1 may therefore be read as follows:

A composition of vitroceraamic type comprising, in mol%:

GE	5-40
S+Se	40 - 85
Sb+As	4 - 40
MX	2 - 25

in which:

- M represents at least one alkali metal chosen from Rb, Cs, Na, K and Zn,
- X represents at least one chlorine, bromine, or iodine atom.

with the sum of the combination of the molar percentages of the components in said composition being equal to 100.

The claimed invention differs from the chalcogenide glasses, chalco-halide glasses and the halide glasses disclosed in Aitken. First, Aitken's chalcogenide glasses comprise Ge, S and As in similar amounts as the claimed invention, but do not contain any MX, M being at least one chlorine, bromine, or iodine atom, and X being at least one alkali metal chosen from Rb, Cs, Na, K and Zn. Since Aitken does not disclose the claimed composition, Aitken does not anticipate the composition.

With respect to the chalco-halide glasses, Aitken's chalco-halide glasses further comprise Cl, Br, or I. However, Cl, Br and I are never combined with an alkali metal chosen from Rb, Cs, Na, K and Zn. According to the claimed invention, the composition comprises between about 2-25 % of MX, wherein:

- M represents at least one alkali metal chosen from Rb, Cs, Na, K and Zn, and
- X represents at least one chlorine, bromine, or iodine atom.

This is an essential feature of the invention because MX increases the transparency of the glasses in the infrared, in particular in the wavelength between 0.7 to 14 $\mu$ m.

The chalcogenide glasses disclosed by Aitken do not comprise any MX according to the features of the claimed invention and have only a wavelength transmission range between 530-560 and 2,400 nm (0.53-0.56 and 2.4  $\mu\text{m}$ ). See Aitken at col. 8, Table 1.

Moreover, the claimed invention contains the feature MX, wherein X can be Cl, Br or I, but cannot be F. Indeed, the claimed composition does not comprise any MF, such as NaF, because glasses comprising the element fluorine are not transparent over 8  $\mu\text{m}$ . On the other hand, glasses comprising MCl, MBr and/or MI have a transparency up to 14  $\mu\text{m}$ . Aitken directs a skilled artisan to use fluorine and the claimed invention does not use any fluorine. Therefore, Aitken does not teach or suggest the claimed invention or anticipate the claimed invention.

With respect to halide glasses, Aitken teaches that the typical composition of halide glasses is: 53 %  $\text{ZrF}_4$ , 20 %  $\text{BaF}_2$ , 4 %  $\text{LaF}_3$ , 3 %  $\text{AlF}_3$  et 20 % NaF. See Aitken at col. 10, lines 22-25. Thus, none of the elements Ge, S, Se, Sb and As are typically contained therein.

The Office Action indicates that a typical halide compound may contain 20% NaF. However, the claimed invention recites the limitation of MX to be NaCl, NaBr, NaI, etc., but not NaF. Again, the Applicants do not use fluorine, because fluorine is not transparent over 8  $\mu\text{m}$ , which is not the case for the glasses comprising MCl, MBr and/or MI which have a transparency up to 14  $\mu\text{m}$ .

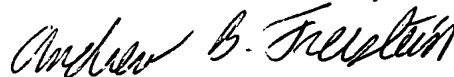
Aitken does not teach or suggest a glass composition comprising MX, M being at least one chlorine, bromine, or iodine atom, and X being at least one alkali metal chosen from Rb, Cs, Na, K and Zn. Aitken teaches a glass comprising fluorine. The claimed invention used chlorine, bromine and iodine, but not fluorine, because of the superior, unexpected results of glasses without fluorine. Accordingly, Aitken does not anticipate the claimed invention. Reconsideration and withdrawal of the rejection are respectfully requested.

**IV. Conclusion**

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-23 and 2 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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